



U.S. Fish & Wildlife Service

Arctic National Wildlife Refuge

Spring 2011

Fueling Up at the Mudflats



Pectoral Sandpipers are one of more than 16 species of shorebirds that use the Refuge's coastal mudflats to rest and feed before migrating south. These birds average a weight of 2.6 ounces, and travel more than 8,000 miles to winter in South America. (USFWS)

Late each summer, thousands of shorebirds congregate on the Refuge's coastal mudflats looking for fuel. No, not oil. These birds are looking for food—invertebrates such as midges, amphipods and worms—to fuel their bodies with energy for the long migration south.

The mudflats are where the north-flowing rivers of the Refuge widen into deltas and empty into the Arctic Ocean. Rivers and the ocean deposit sediments and water to form muddy coastal areas with shallow freshwater and saltwater pools. Shorebirds use their probing beaks to search for invertebrates that live in the pools.

The shorebirds' goal at the mudflats is to eat lots of food. This will become energy to power flights that may

extend thousands of miles without stopping. Some shorebirds, such as Dunlins, travel to Japan, while others, including American Golden Plovers and Semipalmated Sandpipers, will migrate to South America. In all, 16 species of shorebirds use the mudflats, and each must journey considerable distances to reach their wintering grounds.

To better understand the importance of the Refuge's river deltas to birds, Refuge biologists are collaborating with a doctoral student at the University of Alaska Fairbanks to map the distribution of invertebrates and shorebirds at four river deltas within the Refuge. The multi-year study involves spending a month and a half each summer at the deltas to survey the shorebirds and to collect soil samples which are then analyzed for invertebrates. Biologists place colored leg bands on some shorebirds to study their movements between the deltas, and on their migration routes.

Once all the data are collected, researchers will examine the relationships between mudflats, invertebrates and the birds. Results will help Refuge biologists identify what areas are important for shorebirds as they prepare for long migrations, and how environmental conditions such as weather and water levels affect shorebird use of the areas.

Scientists are also considering the future of these mudflats. Climate change is contributing to warmer air temperatures, reduced sea ice cover and changing sea conditions, all of which may impact the shorebirds and their habitats.

The mudflats are essential feeding areas for migratory shorebirds. Refuge managers are committed to protecting habitats important to these birds, so that these areas can fuel many future migrations. 🐾



Refuge biologists set up shop where the birds are—on the delta mudflats. (USFWS)

What future for the Arctic Refuge?

The Refuge's management planning process has been underway for a year and has another year to go. The result will be a document called a Comprehensive Conservation Plan (CCP). The Arctic Refuge CCP we are developing now, along with its accompanying Environmental Impact Statement (EIS), will be a revision of the Refuge's original CCP created in 1988. The new CCP will contain goals, objectives, policies and guidelines detailing how the Refuge will be managed over the next 15-20 years.

The Refuge's CCP planning process includes two formal opportunities for public input. The first occurred in the spring of 2010, when the Fish and Wildlife Service introduced the planning process to the public and asked what concerns or issues the public thought the revised CCP should address (see <http://arctic.fws.gov/pdf/ccp1b.pdf>).

During that first comment period, we received about 1,500 original responses and 92,500 form letters. Commenters shared their concerns about protecting wilderness qualities on the Refuge, the nation's need for oil development, recreational use, rivers, subsistence and Native issues, and biological resources (see <http://arctic.fws.gov/pdf/ccp2b.pdf>).

Refuge staff worked diligently since then to complete the draft revised CCP, which will be available for a 90 day review period once the draft is made public. A summary booklet of the draft text, along with the complete draft text, will be available on the web at <http://arctic.fws.gov/ccp.htm>.

During this comment period, you can submit comments in a number of ways:

Online: <http://arctic.fws.gov/ccp.htm>

Email: ArcticRefugeCCP@fws.gov

Mail:

U.S. Fish and Wildlife Service
Arctic NWR - Sharon Seim
101 12th Ave, Rm 236
Fairbanks AK 99701-6237

We encourage you to share your thoughts with us. The most useful comments will be about specific content in the CCP. We are also looking for points we may have missed. Keep in mind that comments do not constitute a vote—we are looking for quality not quantity. We will consider your comments as we write the final plan, scheduled for release in summer 2012.



Public meetings:

Meetings are planned for Fort Yukon, Arctic Village, Venetie, Kaktovik, Fairbanks and Anchorage. Visit the web at <http://arctic.fws.gov/ccp.htm> for dates and locations.

Learn more:

Information about the CCP process, and all CCP-related materials, are available at <http://arctic.fws.gov/ccp.htm>. This page will be periodically updated to provide current information on the planning process.

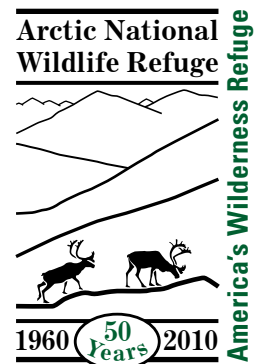
Information about the Arctic Refuge is available at <http://arctic.fws.gov>.



Northern Hawk Owl
(USFWS)

Celebrate our 50th

Join us in celebrating a milestone in American conservation history—the establishment of the Arctic National Wildlife Refuge. The Refuge turned 50 on December 6, 2010 and we are celebrating its anniversary throughout the country. Here's how you can join in.



See a photo exhibit:

Arctic Sanctuary: Images of the Arctic National Wildlife Refuge

In his large-scale photographs and detailed close-ups, photographer Jeff Jones immerses viewers in the Refuge's raw beauty and wildness. Laurie Hoyle's accompanying interpretative texts lead viewers through a contemplative exploration of the Refuge. A book of the photos and text is also available.

Enjoy a documentary film:

America's Wildest Refuge: Discovering the Arctic National Wildlife Refuge

This hour-long, high definition video includes sweeping views of the Refuge and its wildlife, along with interviews of those who know it best.

Go to a play:

Wild Legacy

The theatre company "Voices of the South" is presenting a play that honors those who helped make establishment of the Arctic Refuge possible.

Gain A Sense of the Refuge:

This five-poster series, also in booklet form, provides a "sense of the Refuge" by presenting highlights about Refuge management; the area's plants, animals and people; and the arctic environment that supports them all.

Find event locations and dates at <http://arctic.fws.gov/50th.htm>. To bring these events to your community call 907-786-3469. To inquire about the posters or booklet call 907-456-0500.

McCall Glacier: Reflecting 50 Years of Climate Change

It may not be a good time to be a glacier, but it's a great time to be a glaciologist. That's because change makes science interesting, and McCall Glacier has definitely changed during the 50 years it has been studied. So says Dr. Matt Nolan, a University of Alaska Fairbanks (UAF) glaciologist who is studying McCall Glacier in Arctic Refuge.

The glacier, which is about 4.5 miles long and 65 stories tall (656 feet) at its thickest, sits near the center of the Refuge in the Brooks Range mountains. It has one of the longest and most complete research records of any glacier in the United States. Research started in 1957, three years before the Refuge was established, and stemmed from a global effort to start long-term studies of glaciers in the Arctic and Antarctic.

In the 54 years since, scientists have noticed several trends in the glacier: McCall is losing ice at a rate that is increasing with time, the glacier is moving forward more slowly, and the glacier is getting colder.

Losing Ice

McCall Glacier may live out its last days some time in the next 100 years. This is in sharp contrast to the glacier before the mid 1800s, when it was increasing in thickness and experiencing one of its largest advances in the past 10,000 years. In the 1890s, the glacier stopped advancing and eventually started to lose ice and snow.

Researchers know that the way glaciers grow or shrink depends on mass balance, the amount of snow that falls on the glacier minus the amount of snow or ice that melts in a given year. When more snow falls than ice or snow melts, the glacier increases in

size and has a “positive” balance. When a glacier loses more ice and snow than it gains, the glacier has a “negative” balance and shrinks.

Past research has shown that McCall Glacier has been shrinking for more than 50 years, probably because of warming air temperatures. The rate of snowfall remained fairly constant over that time period, while air temperatures increased. In 1993, UAF researchers found that the glacier's yearly rate of ice loss almost doubled during the previous twenty years, corresponding with an air temperature increase of 2.2° Fahrenheit during that time period.

Since the 1990s, glacier melting has continued to increase. Scientists are still analyzing the data to see how warming and other factors are currently influencing the glacier.

Slowing down

The glacier, which is on an incline, flows slowly forward under the combined effects of its own weight, the slope of the ground surface, and gravity. The glacier is slowing down because it is getting thinner and lighter. It currently moves about 39 feet per year in its fastest part, which is about a third slower than the rate 50 years ago.

Getting Colder

Perhaps the most counterintuitive of all the changes—McCall Glacier is getting colder. While it may sound like a good thing, it indicates that there is less snow on the glacier. Think of the glacier as having two sections: upper and lower. The upper part is where the glacier begins high in the mountains. This is where most snow accumulates. Now think of this

upper part as having three layers. The top layer is the new snowfall in a given year. The middle layer is “firn” or old snow that is becoming ice. The bottom layer is ice.

When surface snow melts, the resulting water percolates down into the firn where it refreezes. The process of refreezing releases energy in the form of heat. This heat keeps the glacial ice underneath it at just below the melting point even if air temperatures at the glacier's surface are much colder.

Because of warmer temperatures, the glacier's upper portion is accumulating less snow each summer. This means there is less snow to melt, refreeze and release heat. As a result, the layer of firn is becoming thinner and the glacial ice underneath is becoming colder. In some locations, the ice temperature has dropped by 9° Fahrenheit.

Looking back to look forward

While researchers have learned much from McCall Glacier in the past 50 years, they are looking forward to learning much more. In 2008, researchers extracted an ice core almost 500 feet long, dating from the present back 350 years. The core is a time capsule, storing information about past climate and environment in the pollen, atmospheric chemicals, and air pollutants that are trapped within the ice. This will give researchers a glimpse into what the climate was like at McCall Glacier before there was technology to record weather data.

Researchers still have much to learn. The knowledge gained will help them better understand the dynamic processes that affect the glacier, the Refuge, and ultimately all of us. 🐾



Scientific camp (lower right) overlooking McCall Glacier. This photo hung in the White House's Office of Science and Technology. (Matt Nolan)

Partnership for Polar Bears

Local guides who lead the way to polar bears are also learning how to lead the way in polar bear conservation. The guides attended a Refuge-sponsored workshop about how to legally and responsibly view polar bears around their community and on nearby Refuge lands and waters. The workshop was designed for those who operate businesses guiding visitors to view polar bears and other wildlife.

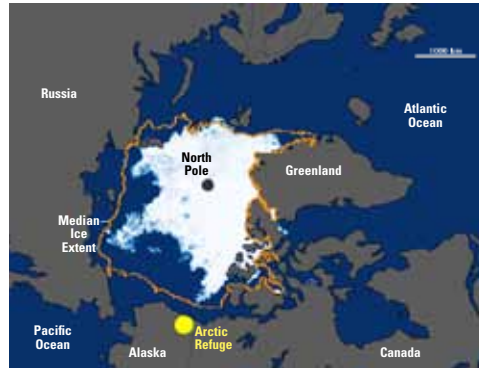
The guides are based out of Kaktovik, a small village in prime polar bear habitat on the Refuge's northern boundary. Visitors come here for the opportunities to see polar bears and because the village is a gateway into Arctic Refuge. The interest in polar bear viewing is growing, creating a challenge for both the U.S. Fish and Wildlife Service (FWS) and the community as they collectively manage for human safety and polar bear conservation.

The Refuge partnered with another FWS office, Marine Mammals Management, to develop and conduct the polar bear workshop. Many wildlife guides attended, along with Kaktovik community leaders. They discussed how to view polar bears without disturbing them, and the legalities involved with viewing a protected species. Polar bears are listed as a threatened species under the Endangered Species Act and are also protected under the Marine Mammals Protection Act. With some exceptions, both acts prohibit disturbing, harassing, hunting or killing polar bears.

The guides also learned about the Refuge's Special Use Permit program which protects Refuge lands and waters by regulating commercial use. All commercial guides who offer polar bear viewing in the Refuge must receive a permit from the Refuge before clients use their services. Clients can see which guides are permitted or seeking permits by visiting <http://arctic.fws.gov/pbguide.htm>.

The workshop is part of a larger effort to protect the estimated 1500 polar bears that include Kaktovik and the Refuge coast within their home range. As part of this effort, the community of Kaktovik and FWS will continue working together to lead the way in polar bear conservation. 🐾

Sea Ice Update



Arctic sea ice observations, collected by NASA's Aqua satellite, shows sea ice extent on September 19, 2010. (NASA and USFWS)

Last Summer's Arctic Sea Ice

On September 19, Arctic sea ice reached its 2010 minimum at 1.78 million square miles. This was the third lowest sea ice extent on record. The record low, set in 2007, was 1.59 million square miles. The 2010 minimum was part of a larger pattern of overall Arctic sea ice decline dating back to at least the early 1970s.

The image above shows ice-covered areas that range in color from white (highest concentration) to light blue (lowest concentration). Ocean water is dark blue, and landmasses are dark gray. The orange outline delineates areas that were at least 15 percent ice-covered in 10 or more of the years between 1979 and 2000. Compared to this long-term average, sea ice concentration north of Alaska and eastern Siberia was especially low in 2010.

Record Low Winter Arctic Sea Ice

This past winter (2010–2011) unusually cold temperatures and heavy snowstorms plagued North America and Europe, while conditions were unusually warm farther north. The US National Snow and Ice Data Center reported that in 2011 the Arctic sea ice was at its lowest extent ever recorded for January (since satellite records began).

The Data Center offered two possible explanations. One reason is the Arctic Oscillation, a seesaw pattern of differences in atmospheric pressure. In December 2010 and January 2011, the Arctic Oscillation enabled cold air to creep south and relatively warm air to move north. This resulted in cold

Polar Bears on Ice

On top of the sea ice lumbers a polar bear. Underneath the sea ice swims a seal. They are both heading toward the same hole in the ice—one for perhaps its last breath of air, and the other for a meal. Seals are the polar bear's primary food, but it is the sea ice that makes hunting seals possible. Polar bears also use the sea ice to seek mates, to rest, and to travel long distances.

Polar bears are located in the Arctic where the ice-covered Arctic Ocean encircles the North Pole, and frozen lands encircle the ocean. There are 19 different populations of polar bears throughout this area, with a combined total estimate of 22,000 to 25,000 polar bears. Those that use Arctic Refuge are considered part of the Southern Beaufort Sea (SB) population, named after the sea that comprises most of their habitat. Their range includes 800 miles along the north coasts of Alaska and Canada.

While SB polar bears have a large range, studies show that they concentrate in areas with more than 50% ice cover and over shallow waters relatively near the coast. These conditions provide their favorite foods: bearded and ringed seals.

A warming climate is causing multi-year arctic sea ice to thin or disappear, and seasonal ice to melt earlier and freeze later. The result is larger stretches of open water that are ice-free for longer periods of time.

Polar bears must swim across this water to travel between ice and land, and it is not uncommon for bears to rest without moving for days after completing such long distance swims.

Because of anticipated wind and ocean current patterns throughout the 21st century, scientists predict that the greatest declines of optimal polar bear habitat will occur in the Southern Beaufort Sea and its western neighbor, the Chukchi Sea.



Polar Bear (USFWS)

Space Bears

A grizzly bear walks in the mountains of the Brooks Range one morning in May. Three hundred miles south in Fairbanks, Alaska, a Refuge biologist is able to pinpoint its location because the bear is wearing a collar that is communicating with satellites orbiting the earth.

Unbeknownst to the grizzly, space-age technology has become an important tool in tracking its travels. Its satellite collar has a Global Positioning System (GPS) unit inside, allowing it to do what scientists cannot—locate the bear over rugged terrain 24 hours a day. Eleven grizzlies within Arctic Refuge were fitted with these satellite collars.

How the collars work:

Six times a day, the GPS receiver on each bear collar triangulates its location from signals sent by navigation satellites that are spinning through space 12,000 miles above the earth. Bear locations are stored within the collar's GPS unit and are also sent skyward to weather satellites circling 500 miles overhead. These weather satellites relay the location information down to tracking stations that send it on to computers in Maryland and in France, where the data are processed and posted onto a website. In Fairbanks, biologists download the locations from the website and plot them on maps.

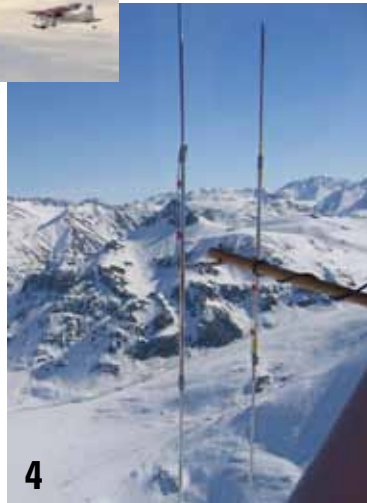
What Biologists have learned:

From the bear locations and their movements, biologists detected patterns of sleep and activity, and plotted areas where bears concentrated their time. When a bear stayed at one location for more than 12 hours, biologists suspected it was feeding on a dead animal.

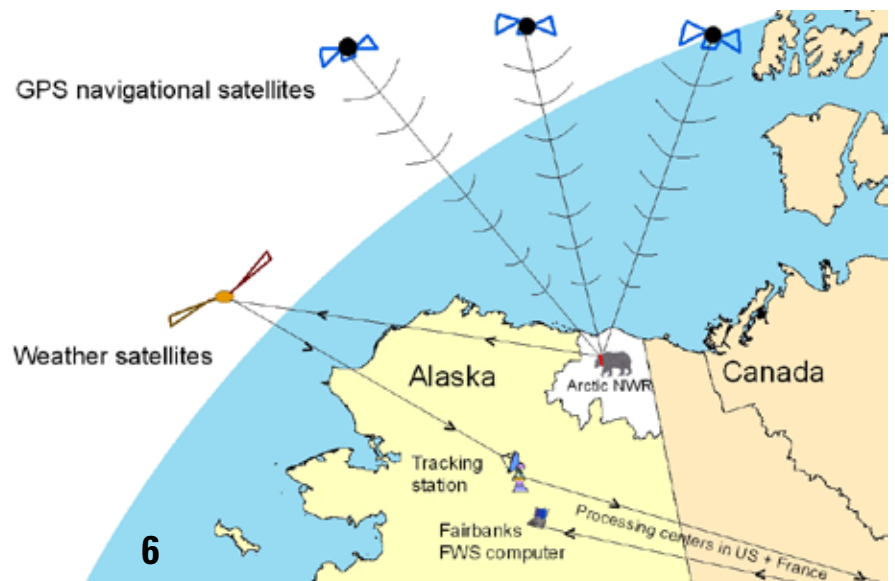
When possible, the researchers visited bear locations to more closely investigate the bears' activity and habitat. On some occasions, they found a bear near a dead caribou or saw tracks and buried food.

In April and May, when arctic grizzly bears emerged from winter dens, the landscape was still snow-covered and few bear foods were available. During this difficult time of year the collared bears dug and ate roots and fed on winter-killed caribou and moose.

While Refuge grizzly biologists use space-age collars, their goals are still down to earth. They want to learn more about the lives of arctic grizzly bears, their movement patterns, and their relationships with the plants and animals within the northern landscape. 🐾



- 1) Collaring tranquilized bear
- 2) Collar with GPS unit and battery pack
- 3) Tracking from airplane
- 4) Radio antenna on plane
- 5) Bear found on hillside
- 6) Diagram of bear collar receiving signals from GPS satellites and sending data via weather satellites. (USFWS)



Invasive Plants: Too Close for Comfort

The Arctic Refuge is one of the largest intact wilderness areas in the United States and one of the few places that is largely free of invasive plants. That could change as more invasive plants make their way to Alaska and the Refuge with the aid of human travel and activity. And as climate change brings warming temperatures and lengthening growing seasons, plants introduced to the Refuge may find life progressively easier.

The Refuge is an important home for many species of wildlife. Just as important are the native plants that provide them with food and shelter. Invasive plants could threaten Arctic ecosystems if they replace the native vegetation.

Many Refuges are waging costly battles to contain invasive plants. Arctic Refuge is in a unique position to work with visitors and commercial service providers to prevent the problem before it happens.

One likely way for invasive plants to reach the Refuge is with the help of humans. We need look no further than Fairbanks for an abundant source of invasive plants. Seeds and plant fragments can travel far by hitching rides from unsuspecting people and their vehicles. Seeds can stick in the soles of a boot or on a sock. Plant fragments can wrap around a boat motor or make their way into the float of an airplane.

Help reduce the chances of invasive plants reaching the Refuge.

Don't bring invasives in from outside.

- Before entering the Refuge, make sure clothing, equipment, vehicles and aircraft are clean by removing all dirt, mud and debris.
- Watch out for “hitchhikers”—those seeds that stick to your socks, clothing or domestic animals’ fur.
- Don’t pick flowers and then discard them where they don’t belong.
- Don’t use felt-sole waders. They will become illegal in Alaska in 2012 because they have been known to transport invasive algae.

Invasives are non-native species that may cause environmental or economic harm if they become established. Here are two examples of invasive plants to watch for—one on land and one in the water. These are just some of the many invasive plants that are moving closer to the Refuge each year.

White sweetclover—anything but sweet (*Melilotus alba*)

White sweetclover is a biennial 2 to 5 feet tall. Its fragrant white flowers bloom throughout the summer. Each plant can produce up to 350,000 seeds which may remain alive in the soil for decades.

Impacts in Alaska: White sweetclover was used in the past for roadside erosion control in Alaska. Now it has formed large stands along rivers and roadways, replacing native plants such as willow and fireweed. It has spread north into the Brooks Range along the Dalton Highway, and is present in Fort Yukon.



Common waterweed—tangled messes (*Elodea canadensis*)

Common waterweed is an underwater perennial that forms dense masses in lakes, ponds, and ditches. Its leaves are arranged in whorls around long, trailing stems. It reproduces from broken-off pieces of stem.

Impacts in Alaska: Common waterweed was discovered in 2010 growing in a Fairbanks slough. If it expands it could form a barrier to fish and boaters.

Common waterweed is an aquarium plant probably introduced into Fairbanks waterways when someone dumped out their aquarium.



- Clean and dry anything that comes in contact with rivers or lakes before entering new waters.
- Visitors who bring animals to the Refuge should choose bedding and feed materials that will not introduce new plants.
- If you see an invasive plant on the Refuge, let us know. Take photos, note its location (GPS coordinates if possible) and email to arctic_refuge@fws.gov.



Elodea in Fairbanks slough.
Fairbanks Soil and Water
Conservation District photo

Mask Activity: Become a Wood Frog

The wood frog is one of the few creatures that can “freeze to death” but not die. Frogs are amphibians, so they’re cold blooded. This means their bodies are the same temperature as their surroundings, and they depend on warm temperatures to keep them warm. However, in Arctic Refuge, winter temperatures are very cold, so wood frogs have adapted to survive our frosty winters.

In the fall, wood frogs find a shallow hollow in the ground and burrow into the dead plants and leaves. As fall temperatures get colder, the frogs freeze nearly solid—starting with their eyeballs and toes, then inward until everything is frozen, even their heart and brain.

Like other animals, much of a frog’s body is made of water. When water freezes it forms sharp ice crystals that can cut into the body’s cells. Wood frogs protect their cells from being sliced by the ice crystals by filling their cells with a sugary liquid. This works like antifreeze to resist forming ice crystals in cold conditions. The frozen frogs are also protected by the snow blanketing the ground. Snow insulates the ground and keeps the soil and the frogs warmer than the cold winter air above.

In the early spring, when snow begins to melt, the frogs thaw, their hearts begin beating again, and they hop away.

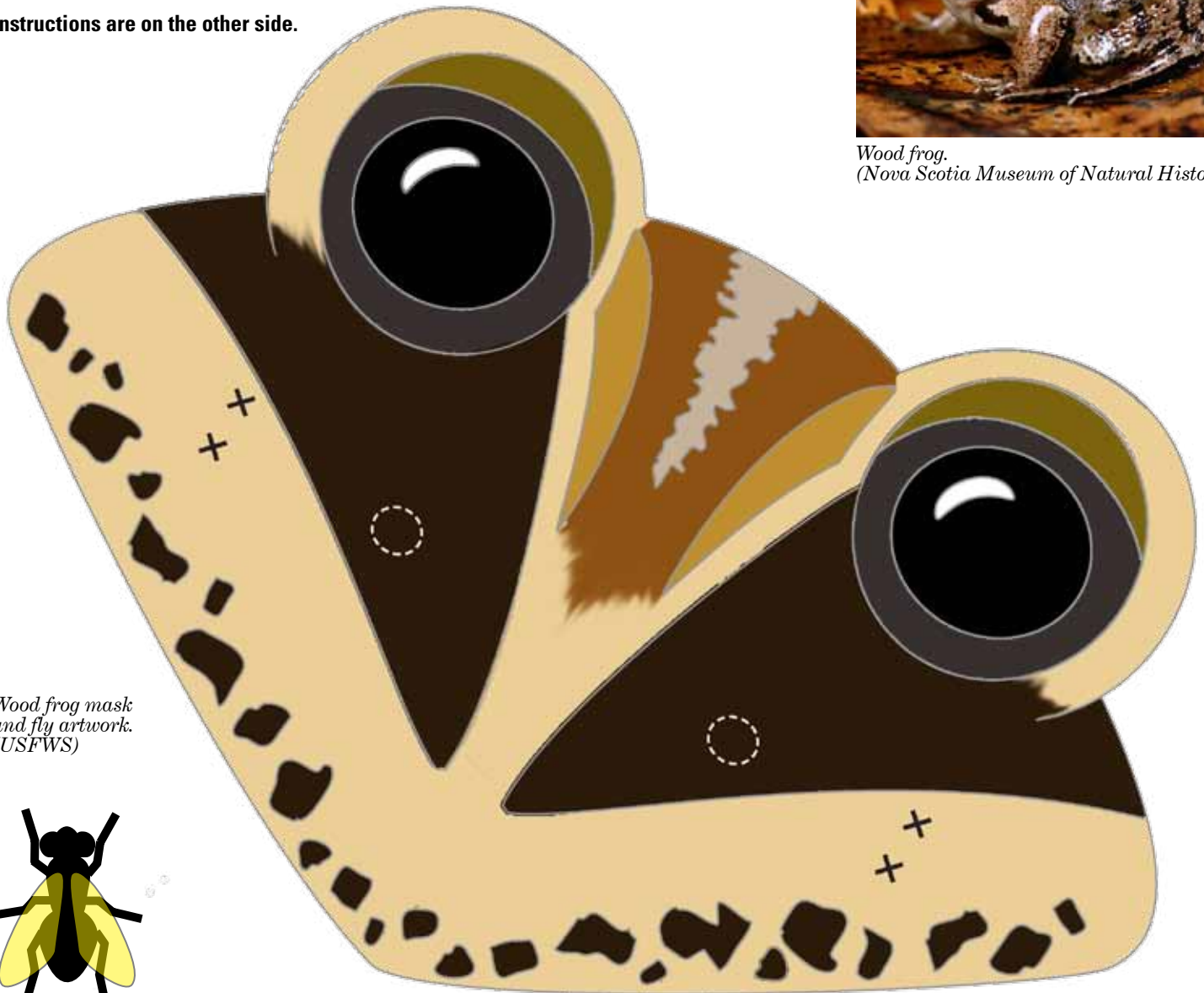
Within hours of thawing, male frogs start singing their quacky, duck-like songs to attract a mate. Later, female frogs lay eggs, which soon hatch into tadpoles. The tadpoles transform into little frogs in about eight weeks.

Arctic summers are short, so wood frogs have to quickly grow from egg to tadpole to adult. Only adult wood frogs survive when they freeze into little ice cubes in the fall. 🐸

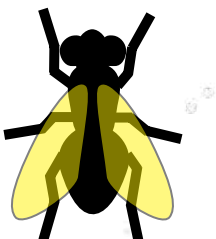


Wood frog.
(Nova Scotia Museum of Natural History)

Instructions are on the other side.



Wood frog mask
and fly artwork.
(USFWS)



Instructions

Cut out the wood frog mask. You can use the already colored side or color the blank side any way you want.

Punch a hole through each dashed circle for your eye holes. Don't cut out the frog's eyes!

Measure and cut 2 pieces of string, both about 10 inches long.

Punch a hole at each X.

Make the ear loops: Thread one piece of string through the holes on the left side of the mask and the other through the holes on the right. Tie the ends of each piece of string together. (Don't tie both strings together.) You're making one loop on each side of the mask. Make sure the loop is the right size to fit around your ear.

Glue the fly to the tip of a roll-up party favor. This is your frog tongue.

Put on the mask, stick out your "tongue," and catch the fly for lunch!



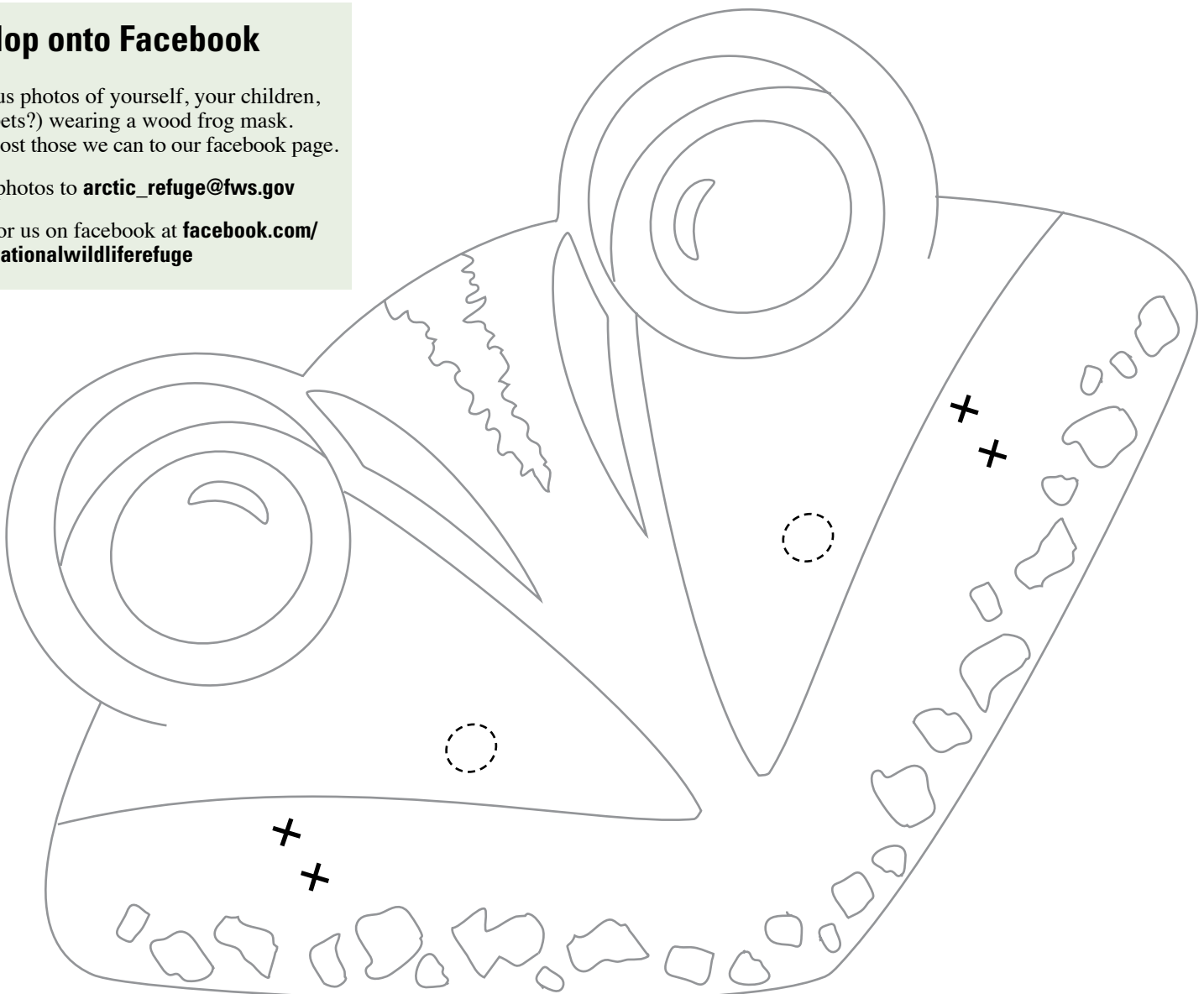
Wood frog catches a fly. (USFWS)

Hop onto Facebook

Email us photos of yourself, your children, (your pets?) wearing a wood frog mask. We'll post those we can to our facebook page.

Email photos to arctic_refuge@fws.gov

Look for us on facebook at [facebook.com/arcticnationalwildliferefuge](https://www.facebook.com/arcticnationalwildliferefuge)



Migratory Bird Calendar Contest Winners

In March, Arctic Refuge was covered in snow, and the temperature plunged below zero each night. It was difficult to imagine migratory birds would arrive in only a few weeks. But inside the Kaktovik and Arctic Village schools, which are on the boundary of the Refuge, students were celebrating the birds that were heading north. The 2012 Alaska Migratory Bird Calendar Contest awards ceremonies were underway.

The contest, sponsored by the U.S. Fish and Wildlife Service (FWS) in Alaska, encourages village students to learn about migratory bird conservation. Each year, these students in kindergarten through 12th grade are invited to submit a poster and a brief written entry. FWS combines the winning entries into a calendar and provides it free to students and families in the participating villages.

This year's contest theme was "Alaska's Birds in the Circle of Life." Twenty-four winners of the state-wide artwork and literature competitions will be published in the 2012 Alaska Migratory Bird Calendar. Of the more than 1,600 entries this spring, 5th grader Melanie Tikluk of Harold Kaveolook School in Kaktovik won the statewide 3rd-5th grade literature award with her poem *Awesome Birds*:

*Birds are awesome,
Birds are kind,
Birds are welcome to my mind.*

*Birds are beautiful,
Birds are amazing wildlife,
Birds are part of Inupiaq life.*

*Birds in Alaska,
Birds migrate from here to there,
Birds fly in flocks and come near.*

The Manager's Choice awards went to 5th grader Michael Klein of Harold Kaveolook School for his literary entry:

*Nests on the tundra
Eggs crack
Chicks hatch
Momma feed her babies
Daddy protects the little ones
Chicks grow
Birds migrate
New year
Nests on the tundra*

Seventh grader Tia Hollandsworth of Arctic Village School won the Manager's Choice award for her artwork which depicts an American Golden Plover in its nesting habitat.



Congratulations to Melanie, Michael and Tia, and many thanks to everyone who participated in this year's calendar contest. 🐾

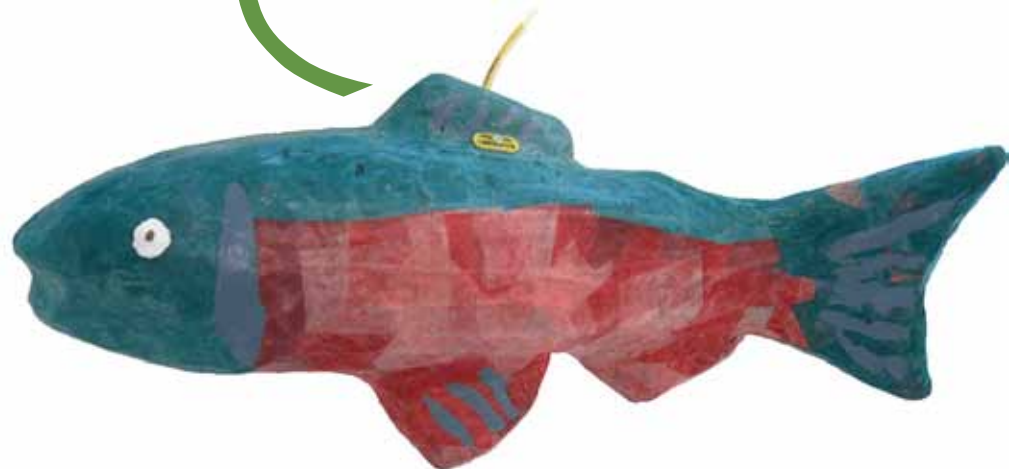
A Fish Story

One minute a resident of Kaktovik was subsistence ice fishing on a mountain lake in the Refuge. The next minute, he was helping out with a U.S. Fish and Wildlife Service (FWS) study that began 15 years before. When he caught a lake trout tagged as #0471, he brought it to his sister who is a public school teacher in the village. She showed her students the fish and called FWS to find out what it meant. Scientists looked at past records to discover that fish #0471 was caught and tagged on August 8, 1995 as part of a lake trout study. After the teacher measured the fish, the FWS biologist calculated that the fish had grown 25% longer and doubled in weight during the past 15 years.

Calls like these are invaluable to Service scientists who study animals over time to determine if populations are healthy.

Tagging a fish and then receiving a report about it years later can reveal a lot about the fish and its ecosystem.

So where is the fish now? It's in a freezer but it won't be landing on a dinner plate. Fish #0471 will be displayed in the public school. Educators are hoping its story inspires kids to get "hooked" on science and to realize they can play an important role in helping scientists understand the wildlife in their area. Besides—they might be the next one to catch a tagged fish. 🐾



Fish tag demonstration on paper mâché fish. (USFWS)

Connecting to Local Communities

Refuge Information Technician (RIT) sounds like a technical job requiring a person to take care of computers, but nothing could be further from the truth. RITs work with people and open the doors of communication between them. They are liaisons between a Refuge and the Native communities within or on its borders.



RITs in Kaktovik (left) and Arctic Village (right). (USFWS)

Arctic Refuge employs two RITs who work for the Refuge and also represent the Native communities in which they live. One RIT is from Kaktovik, on the Arctic Ocean coast. The other is from Arctic Village, on the northern edge of the boreal forest.

These RITs are valuable because they understand the Refuge from two different perspectives. As Refuge employees they contribute to the conservation mission of FWS. They are also members of the Native communities that have been harvesting berries, plants, fish and other animals from these lands and waters long before the Refuge was established.

Understanding these two perspectives enables the RITs to assist communications between Refuge staff and villagers. The RITs talk to village members about how and why the Refuge is conserving its resources and how this relates to their communities. RITs also relay village ideas and concerns to Refuge staff, and RITs may engage their community's youth in environmental education programs or conservation projects.

The RIT program began in 1984 at Yukon Delta National Wildlife Refuge and then expanded throughout Alaska. There are few positions that require such a diverse blend of knowledge and skills. Then again, there are few people who could fulfill these RIT positions, and the Refuge is lucky enough to have two of them. 🐾

Teens Help Refuge and Themselves

Teens from Arctic Village, on the southern boundary of the Refuge, work for Arctic Refuge during the summer to help with conservation projects as member of the Youth Conservation Corps (YCC).



Arctic Village YCC participants. (USFWS)

Sprucing Up the Visitor Experience

With a pile of precut lumber and a photo of a picnic table, a dozen YCC teens built two picnic tables in a half day. It was one of many projects that they completed to spruce up the shared Refuge and village Visitor Center in Arctic Village. The YCC crew members also cleared brush from around the building and airport, planted flowers, renovated the walkway and painted the inside of the building.



Building picnic benches. (USFWS)

The Visitor Center is the first thing many visitors see before entering the Refuge's southern areas. Here they can find informative and educational materials about the Refuge.

While improving the Visitor Center, teens also gained skills and knowledge that will help them on future jobs.

Presenting at Anchorage

Six teens from the YCC group presented at the 2010 Alaska Geographic Youth Summit on Climate Change in Anchorage. Their presentations focused on how climate change was affecting the Arctic, their home. They also listened to other teens talk about climate change and its effects on Alaska.

The Arctic Village YCC participants won two awards for their presentations: "Best Wildlife Scene" and "Best Use of Spectacular Scenery."

All 40 teens that participated in the conference had worked or volunteered in Alaska's national forests or wildlife refuges. The teens networked with each other and met a variety of conservation professionals. They also discovered more about the environmental challenges facing the different regions of Alaska.

Arctic Refuge YCC member Karissa Carroll summed up why she is interested in environmental issues. "I think it's important for us to protect our great lands. Because nothing can replace beauty, wildlife and our homes." 🐾

Sea Ice Update - Continued from page 4

temperatures and heavy snow over much of the US and Europe. At the same time, warm air over the Arctic impeded sea ice growth.

Another factor in the low Arctic sea ice extent could have been the increased areas of open ocean. The white surface of sea ice reflects most of the sun's light and heat back into space. Dark ocean water, by contrast, absorbs most of that energy and reinforces the melting process. 🐾

Information for this article came from NASA's Earth Observatory "Image of the Day" at <http://earthobservatory.nasa.gov/IOTD/view.php?id=46282> and <http://earthobservatory.nasa.gov/IOTD/view.php?id=49132>

Your Recovery Dollars at Work

In 2010, Arctic Refuge hired two seasonal workers and organized Refuge clean-up projects thanks to the American Recovery and Reinvestment Act (ARRA). The Act was created to spur economic growth and also award funds to projects that create employment and benefit local communities. The Refuge's ARRA funds were used for:

River Clean-up: Even a Refuge can stand to lose a few pounds

Last summer, the Refuge lost weight—800 pounds. That's because staff and volunteers collected trash from around the Refuge's rivers and lakes. Among the items hauled out were old fuel drums, the remains of a burned-down cabin and debris from old camp sites. The Refuge was concerned about the accumulating trash because it posed potential problems

for wildlife and people, while detracting from visitor experiences.

Thanks goes out to all who made the cleanups successful, including the Friends of Alaska's National Wildlife Refuges and the commercial air operators who volunteered their planes and time.

Biological Technician: Help arrives before the birds do

The Refuge's bird biologist hired a seasonal employee to help study the Refuge's feathered friends that migrate in each summer. A student from the Alaska Native Science and Engineering Program (ANSEP) at the University of Alaska Fairbanks filled the position. ANSEP helps Alaskan Native students interested in science and engineering gain job experience in their field.

Visitor Services Technician: Student studies up on Visitor Impacts

Arctic Refuge welcomes visitors who enjoy being in wilderness, but even the most conscientious visitors can impact the lands through which they move. The Refuge's visitor services program hired a graduate student to assist with a study of visitor impacts in Atigun Gorge. The gorge receives foot traffic from the Dalton Highway, where informal trails are emerging in the tundra. The trails are damaging soils and plants, and may cause long-lasting impacts to the tundra if they continue to develop.

Managers will consider the results of this study as they decide how to address these impacts. Find out how you can minimize your impacts on the Refuge at <http://arctic.fws.gov/camping.htm>. 🐾



Arctic Refuge makes use of Recreation Ecology

Recreation ecology is the scientific study of visitor impacts to natural areas.

Even the most conscientious visitor can cause impacts to soil, vegetation, wildlife and water.

Many factors influence how and where these impacts develop, and how severe they become.

Some of these factors are: the number of people using the area, and what they do there; the soil and weather conditions; and how susceptible the wildlife, vegetation and substrates are to those impacts.

The Refuge's Visitor Services Technician with a soon-to-be-gone barrel. (USFWS)

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*This news bulletin is available at
<http://arctic.fws.gov/nbs2011.pdf>*



Caribou bulls, cows, and calves on their summer range. (USFWS)